



**University of Technology and Economics in Budapest**

**Faculty of Economics and Social Sciences**

Ph.D. School of

Technical Management and Organization Sciences

Institute of Business Sciences, Financial Faculty

**MANAGING EMISSION RIGHTS IN FINANCIAL REPORTS**

Ph.D. DOCTORAL THESIS

THESIS BOOK

**Prepared by: Reizingerné Ducsai Anita**

**Supervisor: Dr. Laáb Ágnes**

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# I. ANTECEDENTS OF THE RESEARCH AND THE OBJECTIVES OF THIS THESIS

Antecedents, reasons and consequences of climate change have been examined by many for decades. A broad range of society is interested in such researches and results, since all of us have to face the consequences of climate change. Not only climate anomalies are examined in these analyses all over the world, but issues of economic policy, social policy and ethics have also become focused on. A number of researches in environmental economics have been dealing with activities resulting in climate change and the consequences of their restriction or regulation. This research field is unique from the aspect that climate change management may be efficient as a result of a number of factors. One of these factors is restricting the emission of those emitting green house gases.

**During the restriction of emission, companies receive a certain amount of emission rights. I chose the identification and measurement of these new production factors to be my field of research.** *Its place, role, value must be examined as an unsolved issue in financial reports of companies with regard to the different information requirements of the value drivers.* Neither the International Financial Reporting Standards nor the domestic regulators provide an unambiguous guideline to those preparing reports or to managers of companies. With more than a decade of professional experience in teaching, I am convinced that the users of regulators cannot or do not dare to identify or measure new factors of production similar to which they have not met before. *In addition to this, not only the emergence of emission rights is problematic, but the opportunities provided by emission rights must be evaluated in the investment strategy of companies, and the effect of value change on the assets and financing opportunities must be analysed.*

My research focuses on these issues. Throughout my work, I have made suggestions which do not only provide assistance for the mapping and evaluation of these problems in accounting, but the issue of social responsibility originating from climate change is also taken into consideration.

**The accountancy management of European Union's Emission Trading Scheme – EU ETS** is in the centre of this dissertation. I will present the mechanisms operating in the system, I will find a place for emission rights in the financial reports of companies, and I will explore the assessment alternatives which are related to them.

In my thesis

1. I will review the operation of European Union's Emission Trading Scheme, and its effect on the investment-related decision of operators,
2. I will show that the current regulation of emission trade does not support the mapping of relevant financial assets in financial reports,

3. I will present that the management of emission units originating from some of the mechanisms of the emission trading system is not unified in the reports of some states and of some operators,
4. I will prove that it is impossible to find a solution based on the currently effective regulation systems which appropriately satisfies the information need of the financial reports' value drivers,
5. I will make some suggestions which may not only unify the management and assessment of emission units, but can prove to be useful in the authentication procedure of the reports prepared by the operators.

## II. REFERENCE BACKGROUND OF THE THESIS

*While working on this dissertation, I was motivated by the goal of drawing conclusions and finding results which have a measurable use for those who prepare the regulations and for the value drivers of the companies taking part in the regulation procedure and, through them, for the entire society.*

**During my work, I have reviewed and analysed the economic rationale and the raison d'être of emission restriction.** I have examined what sustainability theories (Fleischer 2006) (Turner 1999) have to say about the nature of economic processes and about the roles that the natural environment plays in the economic processes. According to the representatives of ecological economics, the emission of pollutants is not an exceptional event, but an organic part of economic activities (Costanza, et al. 1997), (Ropke 2004). On the other hand, models of environmental economics see the pollution of the environment as a problem, and they offer some type of market regulating instruments as a solution (Málovics és Bajmócy 2009).

As a result of market failures, the society is not in an optimal situation. Obviously, the emission of greenhouse gases cannot be terminated, but the definition of an acceptable pollution level or the opportunity to decrease it to an economically optimal level can be examined (Bator 1958).

According to the theory of neoclassical economics, the goal is not the termination of externalities, but their internalization (Gustafsson 1998), (Gowdy and Erickson 2005). The necessity of state intervention has always provided a reason for debate among researchers. Some say that state intervention decreases the costs born by the society and improves the efficiency of the solutions (Stevenson 1992), (Varian 2003). In the case of emission regulation, however, the demands of different value drivers must be considered in relation to the optimal pollution, in addition to this, producers and their interest groups can exercise different amount of pressure on the regulators with their different level of powers. A unified

tax on emission agreed on during negotiations is just a dream (Coggins and Swinton 1996), (Sovern 2009), (Kerekes és Szlávik 2003).

According to an other group of theories, state intervention is not needed in most cases, because the market can achieve the social optimum by itself as well (Coase 1960). In this case, however, no revenue is generated into the budget, and there are no resources for economic policy decisions aiming at decreasing the emission.

State intervention in relation to emission regulation is justified not only because of the latter. Greenhouse gas emission affects a large number of consumers; therefore, it can be regulated only through state intervention. The traditional method of decreasing the emission is a centrally determined emission level, which must be met by all those affected. The satisfactory efficiency of this method is hindered by the fact that the state has no information about the cost volume relationship, some can easily meet these requirements, while others become economic stalemates if they wish to comply with them (Nahorski and Horabik 2008).

In addition to involving external costs, the most effective instrument combination of emission regulation is the intensification of technological innovation, and the shaping of social awareness. The internalization of externalities must go together with emission trading schemes established on market mechanisms (Coggins and Swinton 1996), (Ürge-Vorsatz és Novikova 2008).

International combat against the climate change started in 1972, but the first real agreement came in 1997 only, when developed countries agreed on decreasing the amount of emission in Kyoto. The Kyoto Protocol entered into force in 2005, and was adopted by 169 states to show their agreement with the obligation to decrease emission.

The emission trading scheme of the European Union is an open system aiming at the enforcement of the undertakings of the Kyoto protocol and global innovation. The Kyoto Protocol applies to the states that signed it and to the companies operating in the member states of the EU and within the EU's trade system which fall under the effect of the regulation. These companies are obliged to keep their CO<sub>2</sub> emission under the threshold specified in the national distribution plan. Compliance may be achieved through the principles of „bubble policy”. The companies which keep their emission under the emission levels distributed for them can sell their unused emission levels to companies which cannot meet the requirements. Technically speaking, companies taking part in the regulation receive emission quotas from the state with which must be squared up at the end of a compliance period. In addition to trading with emission rights, there are two other project-based mechanisms in the Kyoto Protocols which are put in operation in the regulation. This is when an investment is carried out in a country with a developing or developed industry, which investment results in decreasing emission levels. In this case, the investor can take the certified decreased emission quotes home and it can set it off in their own national systems.

The importance to map the emission rights in accounting is justified by the recommendation of World Business Council for Sustainable Development made in 2004, in which it calls

attention to the importance of a register system related to greenhouse gases (WBCSD 2004). The standard was developed in accordance with the „best practice” of the era, but it focuses only on reporting issues, and the monitoring procedures related to that are not regulated. In 2003, the International Accounting Standards Board published a draft of the interpretation of emission rights, but it was withdrawn in 2005 due to some justified objections. In recent years, a number of opinions were published about the reasons for this and about the importance of a mapping system in accounting, but there hasn't been a suggestion for solution. A number of studies prove that those taking part in the regulation process are in an impossible situation. The 2007 survey of the International Emissions Trading Association examined the certified accounting practice of 26 large companies operating in the EU. The study found that the companies follow completely different practices in the key areas of emission rights management. In addition to this study, I examined the accounting and tax regulation of 21 European states in relation to emission rights, and it also showed a diverse picture.

*Based on all this, I came to the conclusion that the appearance of emission unit in the financial reports is controversial, and does not provide opportunities for comparison and does not provide relevant information for the value drivers. The published information affects investment decisions, liquidity data differently, and misleads the users of financial information.*

In order to be able to provide an authentic solution for the mapping in accounting, I first **examined the financial solvency and reportability of emission rights** (Baricz 1990.), (Schildbach 2006.). After justifying the criteria of financial solvency, I **distributed the emission rights in the financial reports in accordance with tax book and value conformity theories based on current regulatory requirements.**

I examined these not only from the point of view of the operators, that is, the owners of emission rights, but from that of the capital market investors as well. The international interpretation which was withdrawn focused solely on the operators, national and international regulatory bodies do not address the diverse features of emission rights from the aspect of investors. I have observed all aspects of the effective regulation, thus, I have examined the tax book and value conformity features of units originating from project-based mechanisms.

I have also provided the solution which can be deduced from the effective international regulations, then, after surveying the Hungarian legal environment of emission restriction, I have deduced the solution in accordance with the Accounting Act. I have examined the authentication processes of reports related to the emissions, and their correlation with financial reports. In connection with the standardization of the authentication process, I have made suggestions with which the multiple accounting of units can be avoided.

### III. METHODS APPLIED DURING RESEARCH

My research is at the intersection of several branches of science. In order to map emission rights into financial reports, my financial and accounting skills were not enough, I had to polish off my economics studies as well. And I also had to add the studies and processes of environmental economics theories.

European emission markets started to operate in 2005. The period between 2005 and 2007 was the era of „learning while doing it” according to the European Commission. The second phase starting from 2008 coincided with the first undertaking period of the Kyoto Protocol. Nearly all regulations had matured and it also turned out that the idea of regulations is not just a sudden flare. Such young regulatory instruments imply a number of opportunities, but many opportunities of failure as well. The fact the studies, opinions of professional politics, research results published in the previous period are limited means a significant burden.

**The methodological foundation of this research is the quantitative processing of the literature in economics, environmental economics and accounting theories, and the comparison thereof.** The collection, analysis and processing of all these made it possible for me to draw reasonable consequences and make hypotheses. I have searched and processed the international and domestic literature relevant to this topic. I have reviewed and analysed the legal environment of emission markets, including the directives and regulations of the European Union and the national regulations as well.

I have examined and analysed the recommendations and directives related to emission regulation and the operation of emission markets issued by international environmental and accounting bodies. These are – among many others: directives and decisions of the IPCC, UN, OECD, and the European Council, recommendations of the World Resources Institute and the World Business Council for Sustainable Development, standards of IASB, FASB and ISAE, and the recommendations of FERC and IETA.

**I have collected the data which are related to the national regulations of the member states to help support my conclusions.**

*I have processed and compared the solutions deducible from the international accounting regulations (US GAAP, IFRS, and standards adopted by the European Union) and the national accounting regulation system. I have developed case studies to present what discrepancies the anomalies of mapping emission rights into accounting can cause in financial reports.*

**I have supported the political results of the domestic regulation of emission rights, the inclusion of those in accounting and the utilization of investments implied with an empiric research.** Based on the National Distribution List, I contacted all affected companies and I sent a survey for all operators and distributors, therefore, my study can be regarded to be representative, I did not filter or select any companies. I have processed the results of my survey using statistical methods (with PASW Statistics application package).

I also backed up the results of the survey with further interviews, the results of which are also included in the conclusions.

#### IV. THE STRUCTURE OF THIS THESIS

The dissertation can be divided into *two well separated units*.

In the *first structural unit* I reviewed and organized the theoretical background of my research thesis. After **the summary of the dissertation made up of theses (Chapter 1)**, I will review the environmental economic relations of emission of greenhouse gases, as externalities, into the air, then I will introduce the regulations which can be used to interfere with these processes. Reviewing the theory background is inevitable to understand how the system works and to identify problems. In the **second chapter** I will focus on explaining the economical *raison d'être* of emission trading, then I will analyse the emission units as instruments for climate protection. Here, I will separately examine the emission trading scheme of the European Union, and I will introduce the Hungarian legal framework related to emission units.

The *second structural unit* will deal with the content of the financial report, and all regulations which promote the management of the appropriate accounting treatment. I will examine the operators, and financial companies emerging as investors. I will present the accounting regulations in connection with the operation of the quota trading system.

In the **third chapter** I will deduce the solution which results from the accounting standards adopted by the European Union. I will make a suggestion on evaluating and introducing the units originating from state distribution and units earned through projects. I will also analyse accounting standards from the aspect of investors and capital market participants, and I will handle forward deal transactions belonging to them with special emphasis, and thus, the definition of the real value of units.

I will take all these aspects in consideration when in the **fourth chapter** I will seek the solution deducible from the Hungarian Accounting Act and the effective regulations. I will also examine the authentication process of emissions, and I will make a suggestion to standardize the reports prepared as a result of the authentication process. At the end of the fourth chapter, I will present the result of the surveys carried out at the Hungarian operators.

As the conclusion of the thesis work, I will make suggestions to the directions of further research.

## V. RESULTS OF THE RESEARCH, THESESES

In my dissertation, I analyse whether the emission trading schedule as a regulation of environmental economics achieves its goal or not, and on the other hand I have presented and proved that the new production factor created by the regulation has value, the presentation of which is justified in financial reports.

The Emission Trading Scheme of the European Union (EU ETS) creates risks as well as opportunities for the affected companies. The system imposes absolute limits on the CO<sub>2</sub> emission of energy sector, oil refineries, cement works, iron and steel works, glass and ceramics works, and paper and cellulose works equipment.

Potential participants of the market are investors as well, who can trade with speculation purposes, contributing to the increased liquidity. Private individuals and organizations dealing environmental protection can purchase emission rights with the purpose to protect the environment, since based on the rights purchased and permanently deleted by them, greenhouse gases cannot be emitted. Institutions which are willing to act against global climate change by purchasing their rights corresponding to their own emission on the market and deleting these rights later can generate similar demand.

The companies taking part in the trading of greenhouse gas emissions which are well informed and can take initiatives have better chances to minimize costs related to adequacy and maximize the values provided for the shareholders (Langford 1998).

Carbon dioxide must be treated as a financial component of a project and the underlying opportunities must be evaluated with this in mind (Homeyer 2001), (Burtraw, et al. 2002). Those entering the market must identify the emission unit as a new production factor, then

- they must enumerate the consequences impacting the company, including the products and services which can be manufactured during limited emission, and the financial impact thereof, and the opportunities of developments in technology,
- systems related to registration and reporting must be developed, monitoring and data provision procedures must be transformed,
- the value of emission rights and the costs related to carbon dioxide emission must be added into the risk management system of the company,
- new company strategies must be developed in the fields of reforming benchmarking, trade, project development and technology,
- all tasks related to authentication processes must be redesigned in projects aiming at uninterrupted operation and decreased emission,
- yields related to not emitted carbon dioxide as an investment opportunity must be analyzed,

- Trade strategy related to emission rights must be developed even if the company buys or sells rights on occasion, and this strategy must include all measures related to covering the trading positions.

Primary participants of the emission trading scheme are industrial companies for which measuring and evaluating new production factors are inevitable to be able to carry out their activities. Costs and expenses emerging during their activities as factors to be calculated with impact product and services prices, market demand and thus the revenues and worth of a company.

From the point of view of climate protection, providing information about the processes which decrease the emission of greenhouse gases has become more and more important.

Financial reports prepared based on international provisions and the Hungarian Accounting Act treat emission units related to the regulation of emission in a different way – and mostly not at their real value.

#### **Thesis 1.**

**Mapping the rights into the financial reports prepared based on International Financial Reporting Standards and the Hungarian Accounting Act is controversial, incomparable and does not provide relevant, reliable information for the value drivers. The displayed information can impact investment decisions and the liquidity and profitability information.<sup>1</sup>**

After analysing the International Reporting Financial Standards, the effective Hungarian Accounting Act and the legal provisions related to emission trading, I made suggestions to map emission rights in international as well as domestic financial reports. The emission right as a financial item can appear in the report of any player in the market. The classification and the evaluation of such financial items can be different in different financial reports, because different components of the regulation are focussed on when emission rights are being mapped. In relation to this, an opinion or an interpretation is needed which provides guidance for market players when classifying the material item during accounting. In my dissertation, I made a suggestion for the mapping of emission rights into accounting based on the general tax book and value conformity features of the International Financial Reporting Standards.

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<sup>1</sup> Supported by publication. Periodica polytechnica Social and Management Sciences 15/2 (2007) 53–57 (published in 2009)

## **Thesis 2.**

### **Based on the International Financial Reporting Standards, the operator**

- **must evaluate the emission units maintained for covering an obligation as an intangible asset at cost price,**
- **units originating from project-based mechanisms as covers of verified emission decrease must be presented at market value after the evaluation of the investment.**

**The distributor or the investor must present these units based on the provision of IAS 2 Supplies standard, but the evaluation thereof must take place at the real value regulated by IAS 39.**

**Based on these, it is suggested to modify the Hungarian legal provisions related to the tax book and value conformity classification of emission values.<sup>2</sup>**

A condition of participation in the emission trading scheme is the reporting obligation of countries, the absence thereof implies exclusion, that is, it means risk for private investors. The basis for the emission reports of the state consists of the individual reports of the operators.

In order for the publications in relation to greenhouse gases and the authentication thereof, a new international quality assurance standard must be prepared and adopted internationally (Elliott 1997). Two professions have strong interest in the creation of such a standard, the auditor profession equipped with financial-accounting knowledge and the authenticator profession knowing technological and industrial processes.

During publication, all data related to the emission trading strategy of the operator and its climate protection measures must be disclosed to the public (Simnett, Nugent and Huggins 2009).

*Legal regulations of the individual countries determine the scope of public data in line with the international provisions, but these should be complemented with data which do not only show economic processes but satisfy the needs of all interested parties of society. Exact and detailed guidance is needed about the scope of data to be published, which ensures the comparability of data with its consistency.*

In relation to the introduction of emission trading systems, Stern came to the conclusion (Stern 2006) that the advantages of acting in a decided way and early significantly exceed the costs of failing to do so. This report is focused on greenhouse gas emission strategies, pricing

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<sup>2</sup> Supported by a publication in the Vezetéstudomány journal (expected date of publication: second half of 2011)

of carbon dioxide and the development of technologies. In addition to these the obligation for publication must be added which provides real information for the managers, investors, the consumers of products created by the operators and the state authorities.

### **Thesis 3.**

**The authentication process in relation to the emission unit accounting which serves as the basis for state control must also be extended: with the extension of the content of the authentication, it must be verified whether the operator realized a profit through the exploitation of market value relations of units originating from different mechanisms without really decreasing its emission, otherwise this quota system will lead to adverse effect in relation to its social objectives.<sup>3</sup>**

When national governments and the regulatory bodies are preparing the distribution plan, they must take into consideration that the most important objective is to facilitate the decrease of specific emission, and the transition to production with specifically favourable emission.

The spreading of technologies with favourable environmental indexes, and primarily with favourable specific carbon dioxide emission indexes is *on the one hand ensured by the market of emission units, since it encourages investments*, which have lower prevention costs per unit than the emission unit costs, and, through the expectations against the new market participants, it facilitates the operators to use developed technologies which run production with a lower specific emission. Production can be facilitated to move towards new technologies through the guaranteed distribution of a lower amount of emission units required by energy efficient technologies with low specific emission.

*Incomes emerging from selling units distributed for payment must be invested so that through this investment the emission of greenhouse gases can be decreased.* When using such revenues, it is advised to use this sum one against one, that is, one unit of revenue originating from selling one emission unit must result in decreasing the emission of greenhouse gases by one emission unit.

I also advise that facilities with different emission decreasing potential should contribute to the number of units to be sold for payment.

*The attitude of the companies that emit greenhouse gases can be understood when they argue for allocation without payment, since they have to calculate with a factor which was free for them earlier. This is the reason why some nations do not take climate protection requirements*

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<sup>3</sup> Supported by a publication: Reizingerné Ducsai Anita: Impact of Emission Rights on the Financial and Revenue Situation of Operators, in: M. Bennett, C. Jasch, S. Schaltegger, M. Csutora, J. Lukács, Gy. Zilahy, P. Kaderják, S. Kerekes: Accounting for Climate Change – What and How to Measure, 2011. Budapest, Aula Kiadó

*into consideration and over allocate themselves so that they can create a favourable competitive situation for their operators.*

The emission decrease potential evaluated per each operator and the appropriate pricing is irrelevant from the aspect of climate protection, since it does not matter who decreases emission – the main point is to decrease the total emission. But then the rationale of economics comes into the foreground, and decisions must be made on the rate of the quota to be distributed and the price thereof.

Emission of greenhouse gases is an externality the pricing of which can be carried out on the market. Not only the treatment of the consequences of greenhouse gas emissions can be evaluated but also the product created during the regulation is also priced which is incorporated in the production value.

Trading of emission rights can establish the decrease of emission based on market principles, in a self-regulatory manner. But it works only if the amount of emission rights is properly determined. In order to make specific decrease in emission possible, the following criteria must be met (Kardos és Fodor 2006):

- the amount of freely distributed rights must be kept low, based on this the price of products can reflect their „carbon dioxide footprints”,
- coherence must be ensured for a possibly applied tax system,
- long-term plans are needed due to the industries’ long investment cycles.

The inclusion of external costs into the prices, that is, the carbonization of prices is examined in an OECD analysis. The opportunity to decrease greenhouse gas emission through the evaluation of energy production on total costs was examined (Pálvölgyi 1997).

The study is prepared based on the MARKAL<sup>4</sup> model of three OECD countries. The definition of external costs originated from the detailed cost estimation of marginal damage of three local air pollutants. The calculated costs were added to the cost prices of production processes.

The effect of evaluating the total costs on the decrease of carbon dioxide emission was positively evaluated by the study. The amount of carbon dioxide emission decrease achieved by using price increasing factors determined based on the marginal damage was around 1-10%, that is, these regulations, if entered into force, can have a positive effect on the future carbon dioxide emission.

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<sup>4</sup> Market Distribution Model of Technologies: An upward model in which the efficiency of technologies was analysed focused on demand and energy transformation. It is a numeric optimization model prepared for the planning of energy production capacities to satisfy a given volume and structure of energy consumption. It was prepared by the International Energy Agency.

The fact that the evaluation on total costs can have negative effects as well, since economic costs can increase and consumers may switch to different energy sources because of the increasing prices, and can deteriorate the standards of energy supply.

The imposition of price increasing factors can be regarded as an equivalence of prices for private goods not charged earlier which now appear as public goods (Pálvölgyi 1997).

The internalization of external costs can keep the inefficient solutions away, and can improve gross welfare by decreasing the negative effects on the environment, that is, charging appropriately calculated factors increasing the total cost has a good effect on the welfare. In addition to this, however, it must be taken into consideration that introducing the evaluation on total cost can have significant redistribution consequences, and, if this is only applied in one country, then it can make the products of the operator more expensive compared to products created elsewhere.

Increased efficiency, a decrease in the relevant costs and flexibility in relation to regulation/application can be achieved by the international trading of greenhouse gas emission rights, since the marginal damages of decreasing the emission is different by each country and by each emission technology. Emission trading will decrease costs by decreasing the emission of greenhouse gases when and where it can be achieved with the smallest possible marginal cost.

#### **Thesis 4.**

**Direct, market-based allocation of quotes would mean a more efficient solution instead of the primarily free distribution in the emission trading scheme of the European Union. In addition to decreasing transaction costs, this would influence the market prices of products and services in proportion to their environmental impacts.<sup>5</sup>**

Emission trading can only decrease the emission of greenhouse gases significantly, if a narrowed, paid allocation takes places in addition to making society aware of the issue. This will have a double effect, since the revenues can be spent on emission decreasing or climate protecting investments. The increase of the operator's costs is just temporary, it facilitates innovation, but the decrease of emission has a long-term effect, affecting future generations. A long-term goal of the emission trading scheme of the EU is to include other greenhouse gases in addition to carbon dioxide, and the introduction of regulations and trading in other industries as well.

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<sup>5</sup> Supported by a publication: Reizingerné Ducsa Anita: Az emisszió-kereskedelem és a vállalkozások alkalmazkodása, VEZETŐI SZÁMVITEL – módszertani füzetek, ISSN: 2061-4519, Complex Kiadó, November 2010.

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